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AGRICULTURAL EXPERIMENT STATION
KANSAS STATE AGRICULTURAL COLLEGE
MANHATTAN, KANSAS

DEPARTMENT OF ANIMAL HUSBANDRY

A CARLOT OF PRIZE-WINNING STEERS
Shown by K. S. A. C.

CATTLE FEEDING INVESTIGATIONS, 1928-'29[1]

B. M. ANDERSON, C. W. MCCAMPBELL, AND M. A. ALEXANDER

The cattle feeding investigations for 1928-'29 include studies of: (1) The relative value of cottonseed meal, linseed oil meal, and corn gluten meal, fed separately and in combination, as protein supplements in cattle fattening rations. (2) Corn, cottonseed meal, corn silage and alfalfa hay versus corn, cottonseed meal, corn silage and ground limestone as cattle fattening rations. (3) Wintering, grazing and fattening calves for the fall market. These studies will be discussed as three separate parts of this circular.

1. Contribution No. 92 from the Department of Animal Husbandry.

PART I

THE RELATIVE VALUE OF COTTONSEED MEAL, LINSEED OIL MEAL, AND CORN GLUTEN MEAL, FED SEPARATELY AND IN COMBINATION, AS PROTEIN SUPPLEMENTS IN CATTLE FATTENING RATIONS

B. M. ANDERSON AND M. A. ALEXANDER

Many inquiries have been received by the Kansas Agricultural Experiment Station relative to the comparative value of linseed oil meal, cottonseed meal and corn gluten meal as protein supplements in cattle fattening rations. Investigations to date do not furnish a complete answer to many of the questions asked. This situation prompted the planning of a three-year test in which range-bred calves would be fed a basal ration consisting of corn, alfalfa hay and corn silage. In addition each lot would receive a protein supplement as follows:

Lot 1—Cottonseed meal.
Lot 2—Linseed oil meal.
Lot 3—Corn gluten meal.
Lot 4—Cottonseed meal and linseed oil meal, half and half.
Lot 5—Cottonseed meal and corn gluten meal, half and half.
Lot 6—Linseed oil meal and corn gluten meal, half and half.
Lot 7—Cottonseed meal, linseed oil meal, and corn gluten meal, one-third each.

Since previous tests have indicated that when corn, alfalfa and corn silage were used as a basal ration the addition of only 1 pound of cottonseed meal was necessary for most profitable returns, it was planned to feed approximately 1 pound per head of a protein supplemental feed in each lot.

The calves used in the 1928-'29 test were bred by the Matador Land and Cattle Company of Texas. A special effort was made to so sort these calves that each lot would be as nearly like the other lots as possible.

The test was started November 15, 1928, and closed May 14, 1929, continuing through a period of 180 days, Three consecutive days' weights at the beginning and at the end of the test were used as the initial and final weights, respectively.

The cattle were appraised at the beginning and the end of the test. It has been found more satisfactory to have an experienced salesman come to the feed lot, study the cattle and appraise them than to send them to the market and figure our final results on actual

selling prices. The cattle are appraised on Kansas City price basis and 75 cents per hundredweight is deducted from the appraised price per hundred to take care of shipping expenses and shrinkage. Grain and hay are charged to the cattle at the price paid by local market agencies; silage at the going price in the community, which is usually about $1.50 a ton over the actual cost of production; and protein supplemental feeds at cost.

The results secured from feeding cottonseed meal, linseed oil meal and corn gluten meal separately as protein supplements are given in detail in Table I.

TABLE I.—THE COMPARATIVE VALUE OF COTTONSEED MEAL, LINSEED OIL MEAL AND CORN GLUTEN MEAL AS A PROTEIN SUPPLEMENT FOR FATTENING CALVES

November 15, 1928, to May 14, 1929—180 days.

RATION FED.	Shelled corn, corn silage, and alfalfa hay. (Fed in each lot.)		
	Cottonseed meal.	Linseed oil meal.	Corn gluten meal.
Lot No.	1	2	3
Number of steers in lot	8	10	7
Number of days on test	180	180	180
	Pounds	Pounds	Pounds
Average initial weight per steer	388.13	387.75	391.43
Average final weight per steer	761.88	786.50	772.00
Average total gain per steer	373.75	398.75	380.57
Average daily gain per steer	2.08	2.22	2.11
Average daily ration per steer:			
Shelled corn	8.59	8.89	8.32
Cottonseed meal	.93	.....	.....
Linseed oil meal	.....	.93	.....
Corn gluten meal	.....	.....	.94
Corn silage	9.21	8.98	8.85
Alfalfa hay	1.94	1.95	1.96
Feed required for 100 pounds gain:			
Shelled corn	413.90	401.50	393.41
Cottonseed meal	44.92	.....	.....
Linseed oil meal	.....	42.11	.....
Corn gluten meal	.....	.....	44.31
Corn silage	443.60	405.20	418.52
Alfalfa hay	93.24	88.03	92.72
Cost of 100 pounds gain	$8.70	$8.55	$8.37
Initial cost per steer at $13 per cwt.	50.46	50.41	50.89
Feed cost per steer	32.52	34.09	31.85
Steer cost plus feed cost	82.98	84.50	82.74
Value per head at home	100.95	108.14	101.13
Margin per head	17.97	23.64	18.39
Necessary value per cwt. at feed lot to break even	10.89	10.74	10.72
Value per cwt. at feed lot, Kansas City price minus 75 cents per cwt.	13.25	13.75	13.10
Margin per cwt.	2.36	3.01	2.38

Feed Prices.—Corn, 77 cents a bushel; cottonseed meal, $50 a ton; linseed oil meal, $60 a ton; corn gluten meal, $50 a ton; corn silage, $5 a ton; alfalfa hay, $15 a ton.

OBSERVATIONS

1. In this particular test the value of cottonseed meal, linseed oil meal and corn gluten meal as protein supplements fed in addition to corn, alfalfa hay and corn silage ranked as follows:

(a) On the basis of average daily gains:
1. Linsed oil meal.
2. Corn gluten meal.
3. Cottonseed meal.

(b) On the basis of the cost of 100 pounds of gain:
1. Corn gluten meal.
2. Linseed oil meal.
3. Cottonseed meal.

(c) On the basis of the necessary selling price to break even:
1. Corn gluten meal.
2. Linseed oil meal.
3. Cottonseed meal.

(d) On the basis of finish as judged by the appraised value:
1. Linseed oil meal.
2. Cottonseed meal.
3. Corn gluten meal.

(e) On the basis of the ultimate margin per steer:
1. Linseed oil meal.
2. Corn gluten meal.
3. Cottonsed meal.

2. On the basis of ultimate profit and allotting 100 to the value of linseed oil meal, corn gluten meal was worth 77.79 and cottonseed meal 76.02. In other words, cottonseed meal was worth 76.02 per cent as much as linseed oil meal, and corn gluten meal 77.79 per cent as much as linseed oil meal, pound for pound or ton for ton, when used alone as the protein supplement for corn, alfalfa hay, and corn silage.

The results secured by feeding cottonseed meal, linseed oil meal and corn gluten meal in various combinations are given in detail in Table II.

TABLE II.—THE COMPARATIVE VALUE OF DIFFERENT COMBINATIONS OF COTTONSEED MEAL, LINSEED OIL MEAL AND CORN GLUTEN MEAL FED AS PROTEIN SUPPLEMENTS IN A CALF FATTENING RATION

November 15, 1928, to May 14, 1929—180 days.

RATION FED.	Shelled corn, corn silage, and alfalfa hay. (Fed in each lot.)			
	Cottonseed meal ½, linseed oil meal ½.	Cottonseed meal ½, corn gluten meal ½.	Linseed oil meal ½, corn gluten meal ½.	Cottonseed meal ⅓, linseed oil meal ⅓, corn gluten meal ⅓.
Lot No.	4	5	6	7
Number of steers in lot	10	9	10	9
Number of days on test	180	180	180	180
	Pounds	Pounds	Pounds	Pounds
Average initial weight per steer	387.00	390.00	387.75	384.44
Average final weight per steer	789.17	763.15	793.83	776.67
Average total gain per steer	402.17	373.15	406.08	392.23
Average daily gain per steer	2.23	2.07	2.26	2.18
Average daily ration per steer:				
Shelled corn	8.83	8.73	8.67	8.63
Cottonseed meal	.46	.46	.....	.31
Linseed oil meal	.46	.....	.46	.31
Corn gluten meal	.....	.46	.46	.31
Corn silage	8.89	8.98	9.11	9.00
Alfalfa hay	1.95	1.95	1.95	1.95
Feed required for 100 pounds gain:				
Shelled corn	395.06	421.34	384.26	395.90
Cottonseed meal	20.88	22.50	.....	14.30
Linseed oil meal	20.88	.....	20.68	14.30
Corn gluten meal	.....	22.50	20.68	14.30
Corn silage	398.04	433.13	403.94	412.82
Alfalfa hay	87.28	94.15	86.43	89.69
Feed cost of 100 pounds gain	$8.35	$8.82	$8.20	$8.40
Initial cost per steer at $13 per cwt.	50.31	50.70	50.41	49.98
Feed cost per steer	33.58	32.91	33.30	32.95
Steer cost plus feed cost	83.89	83.61	83.71	82.93
Value per head at home	107.72	101.12	109.15	104.85
Margin per head	23.83	17.51	25.44	21.92
Necessary value per cwt. at feed lot to break even	10.63	10.96	10.55	10.68
Value per cwt. at feed lot, Kansas City price minus 75 cents per cwt.	13.65	13.25	13.75	13.50
Margin per cwt.	3.02	2.29	3.20	2.82

Feed Prices.—Corn, 77 cents a bushel; cottonseed meal, $50 a ton; linseed oil meal, $60 a ton; corn gluten meal, $50 a ton; corn silage, $5 a ton; alfalfa hay, $15 a ton.

OBSERVATIONS

It is interesting to note that on the basis of (1) average daily gain; (2) cost of 100 pounds of gain; (3) necessary selling price to break even; (4) appraised value per hundred; and (5) margin per steer, the combinations of cottonseed meal, linseed oil meal, and corn gluten meal, fed in lots 4, 5, 6 and 7 of Table II, ranked in the same order. The order in which they ranked was:

1. Linseed oil meal and corn gluten meal, half and half (lot 6).
2. Linseed oil meal and cottonseed meal, half and half (lot 4).
3. Linseed oil meal, cottonseed meal, and corn gluten meal, one-third each (lot 7).
4. Cottonseed meal and corn gluten meal, half and half (lot 5).

In the entire test—lots 1 to 3, inclusive, of Table I, and lots 4 to 7, inclusive, of Table II—the protein supplements used, ranked on the basis of ultimate returns (margin per steer), stood in the following order:

1. Linseed oil meal and corn gluten meal, half and half (lot 6). Margin per steer, $25.44.
2. Linseed oil meal and cottonseed meal, half and half (lot 4). Margin per steer, $23.83.
3. Linseed oil meal (lot 2). Margin per steer, $23.64.
4. Linseed oil meal, cottonseed meal, and corn gluten meal, one-third each (lot 7). Margin per steer, $21.92.
5. Corn gluten meal (lot 3). Margin per steer, $18.39.
6. Cottonseed meal (lot 1). Margin per steer, $17.97.
7. Cottonseed meal and corn gluten meal, half and half (lot 5). Margin per steer, $17.51.

Protein supplemental feeds are necessary in most profitable cattle feeding operations, They are also high-priced feeds. These facts emphasize the necessity of a careful study of the actual value of all protein feeds available.

This test will be repeated next year.

PART II

CORN, COTTONSEED MEAL, CORN SILAGE AND ALFALFA HAY VERSUS CORN, COTTONSEED MEAL, CORN SILAGE AND GROUND LIMESTONE

B. M. ANDERSON AND M. A. ALEXANDER

Alfalfa hay added to silage when fed to fattening cattle improves the ration materially. A question often asked is, "In case alfalfa hay is not available, what can be substituted for it with equally as good results?'' Many experiments have indicated that only a few legume hays and no nonlegume hays can be substituted with equally as good results as alfalfa hay. A study of the analysis of alfalfa and other hays offers at least a partial clue as to why alfalfa improves a cattle fattening ration. It carries considerable protein and is rich in lime. The protein it carries can be made up by increasing the cottonseed meal or other protein supplemental feed used. There are several forms in which lime can be fed. A series of tests conducted by the Kansas Agricultural Experiment Station indicate that finely ground high-calcium content limestone is a satisfactory and economical form in which to feed lime.

The question next to arise was, "If the protein and lime of the usual allowance of alfalfa are made up by an increased amount of cottonseed meal and finely ground limestone, will these additions

take the place of alfalfa hay when both are fed with silage?" A test was conducted by the Agricultural Experiment Station during the winter of 1928-'29 to help answer this question. This test involved the use of two lots of calves—lot 1 fed corn, cottonseed meal, silage and alfalfa hay, and lot 8 fed corn, cottonseed meal, silage and finely ground limestone. The results secured are given in detail in Table III.

TABLE III.—CORN, COTTONSEED MEAL, CORN SILAGE AND ALFALFA HAY VERSUS CORN, COTTONSEED MEAL, CORN SILAGE AND GROUND LIMESTONE

November 15, 1928, to May 14, 1929—180 days.

RATION FED.	Shelled corn, cottonseed meal, and corn silage. (Fed in each lot.)	
	Alfalfa hay.	Ground limestone.
Lot No.	1	8
Number of steers in lot	8	10
Number of days on test	180	180
	Pounds	Pounds
Average initial weight per steer	388.13	386.75
Average final weight per steer	761.88	758.50
Average total gain per steer	373.75	371.75
Average daily gain per steer	2.08	2.07
Average daily ration per steer:		
Shelled corn	8.59	8.28
Cottonseed meal	.93	1.16
Corn silage	9.21	10.96
Alfalfa hay	1.94	.....
Ground limestone	.....	.08
Feed required for 100 pounds gain:		
Shelled corn	413.90	401.00
Cottonseed meal	44.92	55.95
Corn silage	443.60	530.83
Alfalfa hay	93.24	.....
Ground limestone	.....	3.83
Cost of 100 pounds of gain	$8.70	$8.38
Initial cost per steer at $13 per cwt.	50.46	50.28
Feed cost per steer	32.52	31.15
Steer cost plus feed cost	82.98	81.43
Value per head at home	100.95	98.61
Margin per head	17.97	17.18
Necessary value per cwt. at feed lot to break even	10.89	10.74
Value per cwt. at feed lot, Kansas City price minus 75 cents per cwt.	13.25	13.00
Margin per cwt.	2.36	2.26

Feed Prices.—Corn, 77 cents a bushel; cottonseed meal, $50 a ton; corn silage, $5 a ton; alfalfa hay, $15 a ton; ground limestone, $1 a cwt.

OBSERVATIONS

This test indicates:

(a) That corn, cottonseed meal, corn silage and finely ground limestone is practically as good a ration for fattening calves for market as corn, cottonseed meal, corn silage and alfalfa hay, which has long been considered a standard cattle fattening ration.

(b) That silage can be used as the entire roughage portion of a

well-balanced calf fattening ration and that the use of a dry roughage in addition to silage is not necessary if the ration is otherwise well balanced.

(c) That the constituents for which alfalfa hay is most valuable—protein and calcium—may be secured practically as satisfactorily from an increased amount of cottonseed meal, or other protein supplemental feed, and ground limestone.

(d) That the feeder who does not have alfalfa hay to feed with silage can find a very satisfactory substitute for it in the form of an additional amount of cottonseed meal and a limited amount of finely ground limestone.

PART III

WINTERING WELL, GRAZING WITHOUT GRAIN TO APPROXIMATELY AUGUST 1, THEN FULL FEEDING 100 DAYS IN A DRY LOT

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In many sections of Kansas grass is plentiful, roughage in the form of silage is cheap, and grain is comparatively high in price, particularly compared to prices prevailing in the corn belt. This being true, one of the problems confronting cattle feeders of these sections is the production of well-finished cattle with the use of a maximum of roughage and a minimum of grain.

Previous tests conducted by the Kansas Agricultural Experiment Station have shown that wintering calves on a light feed of corn in addition to silage, alfalfa hay, and cottonseed meal, grazing without other feed to approximately August 1, and then full feeding in a dry lot for 100 days is a satisfactory method of producing well-finished cattle in most sections of Kansas.

The question of the necessity of feeding any grain during the wintering period arose. To help answer this question a test was started December 19, 1926, in which one lot of calves was wintered on silage, alfalfa hay and 1 pound of cottonseed meal per head per day, and another lot on silage, alfalfa hay, 1 pound of cottonseed meal per head per day and a light feed of corn—an average of 4.66 pounds per head per day. Both lots were grazed together in one of the college bluestem grass pastures until July 31. On August 1 both lots were placed in small dry lots and started on a ration consisting of ground shelled corn, cottonseed meal, and alfalfa hay. They were got up to a full feed of grain as soon as safely possible.

The calves used in this test were also raised on the Matador Ranch at Matador, Tex., and would have graded good to choice

when the test started. As in all other tests, the calves were sorted carefully to insure similarity in size, type, weight and quality in each lot.

This method of feeding divides itself into three phases: (1) wintering, (2) grazing, (3) full feeding.

This test was repeated beginning December 16, 1927, with calves from the same ranch and will be discussed in detail under its three phases.

Phase I: Wintering

The wintering phase extended from December 16,1927, to May 1, 1928, a period of 137 days. Details of the results secured are given in Table IV.

TABLE IV.—PHASE I: WINTERING

December 16, 1927, to May 1, 1928—137 days.

Lot No.	1	2
Number of steer calves in lot	10	10
	Pounds	Pounds
Average weight per steer, December 16, 1927	345.67	344.67
Average weight to grass as yearlings, May 1, 1928	630.50	537.00
Average gain per steer during winter—137 days	284.83	192.33
Average daily gain per steer during winter	2.08	1.40
Average daily winter ration per steer:		
Shelled corn	5.00	.....
Cottonseed meal	1.00	1.00
Cane silage	18.75	24.30
Alfalfa hay	2.01	2.01
Initial cost per steer, December 16, 1927, at $11 per cwt.	$38.02	$37.91
Feed cost per steer during winter	22.20	13.82
Feed cost plus steer cost to May 1, 1928	60.22	51.73
Necessary selling price to break even when steers went to grass	9.55	9.63
Appraised value per cwt. May 1, 1928, less 75 cents per cwt. to cover shrinkage, shipping expenses, etc.	12.00	12.50
Margin per cwt.	2.45	2.87
Margin per steer	15.45	15.41

OBSERVATIONS ON THE WINTERING PHASE

1. The calves in lot 1, fed some corn, made a gain of 93.5 pounds per head more than the calves in lot 2 that received no corn. It will be interesting to note whether or not they maintain this advantage to the end of the test.

2. At the end of this phase of this test the calves fed some corn were apparently too fat to sell to the best advantage as stockers, as they were appraised at 50 cents under the appraised value per hundredweight of the calves that received no corn. The same was true in last year's test.

3. Had both lots of calves been sold at the end of this phase of the test, lot 2 that received no corn would have returned 4 cents

less profit per head than the calves in lot 1 that were fed some corn. Last year the calves fed some corn would have returned a profit of $2.75 per head more than those that received no corn.

4. The gain of 1.4 pounds per head per day for 137 days made by the calves in lot 2 that received 1 pound of cottonseed meal, 2 pounds of alfalfa hay, and an average of 24.3 pounds of cane silage per head per day, but no grain, emphasizes the value of this combination of feeds as a winter ration for stock calves.

5. Attention should be directed with particular emphasis to the fact that these calves had cost practically $1.50 per hundredweight less in the spring than they cost in the fall, besides furnishing a market for a large amount of rough feed at good prices.

Phase II: Grazing

This phase of the test extended from May 1 to July 30, 1928, a period of 90 days. Both lots were grazed together on bluestem grass pasture. Since these cattle were approximately one year of age when they went to pasture, they will now be referred to as yearlings. Details of the results of this phase of the test are given in Table V.

TABLE V.—PHASE II: GRAZING WITHOUT GRAIN

May 1 to July 30, 1928—90 days.

Lot No.	1	2
Number of steers in lot	10	10
	Pounds	Pounds
Average weight to grass as yearlings, May 1	630.50	537.00
Average weight July 30	711.00	656.00
Average gain per steer on grass—90 days	80.50	119.00
Average daily gain per steer on grass	.89	1.32
Steer cost plus pasture at $8 per head for entire season	$68.22	$59.73
Necessary selling price per cwt. to break even July 30, 1928	9.59	9.11

OBSERVATIONS ON THE GRAZING PHASE

1. The yearlings in lot 2 that were fed no grain the previous winter, and made less gain during the winter than lot 1 fed some grain, made greater gains during the grazing period. This is in keeping with a number of tests conducted by the Agricultural Experiment Station indicating that the gains cattle make on grass are determined, in the main, by the amount of fat they carry on their backs when they go to grass, rather than by the nature of the feed they consumed the previous winter.

2. At the end of the grazing period the yearlings in lot 1 that

received some corn the previous winter were 55 pounds heavier than the yearlings in lot 2 that received no corn the previous winter. At the end of the winter phase they were 93.5 pounds per head heavier. Will they make up this loss during the full-feeding period, or will they continue to make slower gains than the other group?

Phase III: Full Feeding

On July 30 these cattle, now yearlings, were removed from the bluestem pasture, where they had grazed since May 1, to a small feed lot, where they were started on a ration consisting of ground shelled corn, cottonseed meal, and alfalfa hay. They were got up to a full feed of grain as soon as possible. This phase of the test extended from July 30 to November 8, 1928, a period of 100 days. The results of this phase of the test are given in detail in Table VI.

TABLE VI.—PHASE III: DRY-LOT FULL FEEDING

July 30 to November 6, 1928—100 days.

Lot No.	1	2
Number of steers in lot	10	10
	Pounds	Pounds
Average weight per steer July 30	711.00	656.00
Average weight per steer November 6	997.00	931.67
Average gain per steer July 30 to November 6	286.00	275.67
Average daily gain per steer July 30 to November 6	2.86	2.76
Average daily ration per steer:		
Ground corn	15.14	15.03
Cottonseed meal	1.00	1.00
Alfalfa hay	7.15	7.17
Feed cost July 30 to November 6—100 days	$34.86	$34.68
Total cost at home December 16, 1927, to November 6, 1928	103.08	94.41
Necessary selling price to break even November 6, 1928	10.34	10.13
Selling price per cwt. less 75 cents per cwt. to cover shrinkage and shipping expenses November 6, 1928	15.50	15.00
Margin per cwt.	5.16	4.87
Margin per steer	51.47	45.34
Dressing per cent	60.58	60.56

Feed Prices.—Phase I: Shelled corn, 84 cents a bushel; cottonseed meal, $50 a ton; alfalfa hay, $15 a ton; cane silage, $5 a ton. Phase III: Ground corn, 98 cents a bushel; cottonseed meal, $60 a ton; alfalfa hay, $15 a ton.

OBSERVATIONS ON THE FULL FEEDING PHASE

1. The yearlings fed no grain during the previous winter made more gain during the grazing phase but 10.33 pounds less per head during the full feeding phase. Last year the yearlings fed no grain the previous winter made greater gains during the full feeding period.

2. At the end of the wintering phase, lot 1 fed some grain weighed 93.5 pounds more per head than lot 2 fed no grain; at the end of the grazing phase, 55 pounds more per head; and at the end of the full feeding period, 65.33 pounds more per head.

3. Particular attention is directed to the fact that THE CALVES IN LOT 2 THAT WERE FED NO CORN DURING THE WINTERING PHASE GAINED 587 POUNDS DURING THE ENTIRE PERIOD OF THIS EXPERIMENT — WINTERING, GRAZING, AND FULL FEEDING — AND CONSUMED ONLY 26.8 BUSHELS OF CORN PER CALF. The remainder of the feed consisted primarily of roughage—cane silage and grass. A small allowance of alfalfa hay and cottonseed meal was added during the wintering and fattening phases.

HOWEVER, LOT 1, fed some corn during the wintering period and consuming a total of 39.3 bushels per calf during the entire test, MADE A TOTAL GAIN OF 651.33 POUNDS AND MADE $6.13 MORE PROFIT PER HEAD THAN THOSE THAT RECEIVED NO CORN DURING THE WINTER PERIOD.

4. A necessary selling price of $10.13 to $10.34 per hundredweight to break even with corn costing from 84 to 98 cents per bushel during the full feeding period also emphasizes the advantage of this method of feeding cattle.

In order that it may be easier to study this test in its entirety the results of all three phases are combined and submitted in detail in Table VII.

TABLE VII.—WINTERING WELL; GRAZING WITHOUT GRAIN TO APPROXIMATELY AUGUST 1; AND FULL FEEDING IN A DRY LOT FOR 100 DAYS

Lot No.	1	2
Number of steers in lot	10	10
WINTERING PHASE—130 DAYS. December 16, 1927, to May 1, 1928.		
Daily winter ration per steer:	Pounds	Pounds
Shelled corn	5.00	.....
Cottonseed meal	1.00	1.00
Cane silage	18.75	24.30
Alfalfa hay	2.01	2.01
Initial weight per steer, December 16, 1927	345.67	344.67
Weight to grass as yearlings, May 1, 1928	630.50	537.00
Gain per steer during winter—137 days	284.83	192.33
Daily gain per steer during winter	2.08	1.40
Initial cost per steer, December 16, 1927, at $11 per cwt.	$38.02	$37.91
Feed cost per steer during winter	22.20	13.82
Feed cost plus steer cost, May 1, 1928	60.22	51.73
Necessary selling price to break even when steers went to grass	9.55	9.63
Appraised value per cwt. May 1, 1928, less 75 cents per cwt. to cover shrinkage, shipping expenses, etc.	12.00	12.50
Margin per cwt.	2.45	2.87
Margin per steer	15.45	15.41
GRAZING PHASE—90 DAYS. May 1 to July 30, 1928.		
	Pounds	Pounds
Weight to grass as yearlings, May 1	630.50	537.00
Weight July 30	711.00	656.00
Gain per steer on grass—90 days	80.50	119.00
Daily gain per steer on grass	.89	1.32
Steer cost plus pasture at $8 per head for entire season	$68.22	$59.73
Necessary selling price per cwt. to break even, July 30, 1928	9.59	9.11
DRY LOT FULL FEEDING PHASE—100 DAYS July 30 to November 6, 1 28.		
Average daily ration per steer:	Pounds	Pounds
Ground corn	15.14	15.03
Cottonseed meal	1.00	1.00
Alfalfa hay	7.15	7.17
Weight per steer, July 30	711.00	656.00
Weight per steer, November 6	997.00	931.67
Gain per steer, July 30 to November 6, 1928	286.00	275.67
Daily gain per steer, July 30 to November 6, 1928	2.86	2.76
Feed cost July 30 to November 6, 1928—100 days	$34.86	$34.68
Total cost at home, December 16, 1927, to November 6, 1928	103.08	94.41
Necessary selling price to break even, November 6, 1928	10.34	10.13
Selling price per cwt. less 75 cents per cwt. to cover shrinkage and shipping expenses, November 6, 1928	15.50	15.00
Margin per cwt.	5.16	4.87
Margin per steer	51.47	45.34
Dressing per cent	60.58	60.56

Feed Prices.—Phase I: Shelled corn, 84 cents a bushel; cottonseed meal, $50 a ton; alfalfa hay, $15 a ton; cane silage, $5 a ton. Phase III: Ground corn, 98 cents a bushel; cottonseed meal, $60 a ton; alfalfa hay, $15 a ton.